# Diffusion MRI analysis

Propositions accompanying the dissertation

# Diffusion MRI Analysis
## Robust and efficient microstructure modeling

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1. For most diffusion MRI models, the Powell optimization algorithm is more efficient and effective than the Levenberg-Marquardt or Nelder-Mead simplex method.

2. With MCMC sampling, thinning and burn-in are generally unnecessary and should be avoided.

3. The use of variance weighted averaging can reduce the overall variance in group statistics and reduce the effect of data artifacts without discarding data from the analysis.

4. When optimizing a model, proper initialization provides run-time, accuracy and precision benefits.

5. Compared to sensitivity, specificity is a more promising goal of diffusion microstructure modeling.

6. A single shared modeling framework, like the one proposed in this thesis, can merge the knowledge from both the model developers and the computer scientists, providing a solid foundation for future dMRI applications.

7. The hardware required to keep up with ever increasing data sizes is already there, it is the lack of parallel processing software that is the bottleneck.

8. Science should place a larger emphasis on procedural epistemology, to structure knowledge not only from a declarative point of view but also from an imperative point of view, for example, as software.

9. *"Hofstadter's Law: It always takes longer than you expect, even when you take into account Hofstadter's Law"* - Douglas Hofstadter